IoT innovation in Oakland County reduces costs, increases security

The Road Commission for Oakland County's adaptive traffic system eases congestion while protecting data.

Oakland County is one of the richest counties in the nation and has added more residents than any other county in Michigan, especially since the early 1990s. Although a testament to the county's success, its fast-growing population has also resulted in congestion and tangled intersections on local roads. Oakland County leaders knew they needed a long-term solution.

"We realized we could not build our way out of congestion," said Ahmad Jawad, signal systems engineer and ITS manager of the Road Commission for Oakland County (RCOC). "We needed to find a smarter way to push more cars through our roads."

Leaders at RCOC began looking for technology to help manage traffic flow. After reviewing several options, the county chose the Sydney Coordinated Adaptive Traffic Signal (SCATS) system. SCATS manages the dynamic timing of traffic signals, attempting to find the best phasing for the current traffic situation to help move vehicles more effectively and efficiently.

RCOC has been using SCATS since 1992. The county started the system in the city of Troy with 28 intersections and then rapidly expanded it. Within a few years, SCATS was at work in hundreds of intersections throughout the county.

But as the system grew, a new challenge emerged. At the heart of any adaptive signal system are two critical elements: detection and communication. To manage communications, RCOC worked with longtime provider AT&T to set up traditional copper lines that ran to each of the SCATS intersections.

This worked well for close to 20 years, but as the technology aged, the system became problematic. "Our engineers were spending a lot of time maintaining the system and traveling to sites to troubleshoot issues," Jawad said.

A New Approach

The Road Commission for Oakland County once again turned to AT&T, which suggested moving from a wired environment to a wireless solution. An important factor was to ensure critical data from the traffic system would not traverse the public internet for security reasons.

Working together, AT&T and RCOC moved ahead with a new plan: a private mobile network utilizing AT&T virtual private network (AVPN) technology. Instead of the Internet of Things, this new approach is better termed as the **Intra**net of Things.

"When most agencies think of 'private networks,' they think of encrypting their data over the internet," said Renee O'Brien, public sector sales professional at AT&T. "The problem with this approach is the traffic is still on the internet. Regardless of private tunnel encryption, it can still be susceptible to risks like DDoS attacks, BGP hijacks and more."

Instead, the AT&T Private Mobile Connection solution brings together wired and wireless capabilities, allowing RCOC to transmit its critical data over a private AVPN network — bypassing the internet altogether. The Road Commission launched a pilot for approximately 20 intersections shortly thereafter and found the wireless communications worked well and proved to be a stable environment.

"Most importantly, we felt very satisfied that the technology was secure, and there was no threat to the motoring public, in terms of someone hacking into the system over the internet," Jawad said.

The approach also had some unexpected benefits. By moving to the newer technology, it was easier to implement and maintain the system which saved staff time and reduced costs. "It's saving us about 40 percent in monthly expenses," Jawad noted. "That's money we can now divert toward other critical county road needs."

Building Smarter, More Secure Solutions

As Internet of Things (IoT) initiatives bring innovation, automation and value to cities, counties and states nationwide, more jurisdictions are looking to implement them. Yet security concerns associated with critical data have caused some jurisdictions to look for alternative solutions.

"As an integrated solutions provider, bringing mobile, security and IP networks together is the key to protecting data in transit," said John Stuhrenberg, vice president, AT&T Government and Education Solutions East.

Moving to the **Intra**net of Things allowed RCOC to reap the benefits and scale of IoT technology while fortifying security.

Today, RCOC supports more than 700 traffic signals using this technology and plans to convert all 1,500 traffic signals to the new architecture over the next few years. The system automatically balances the flow of data traffic over the network, enables engineers to perform remote maintenance from the office, and helps ease traffic congestion and improve traffic flow throughout the county.

"We are hoping that this is our gateway to additional innovation like connected vehicles," Jawad said. "This technology will definitely bring future opportunities, and security will be at the heart of all of them."

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